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Forest Service

Pacific Northwest
Research Station

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Recent Publications of the Pacific Northwest Research Station, First Quarter 1986

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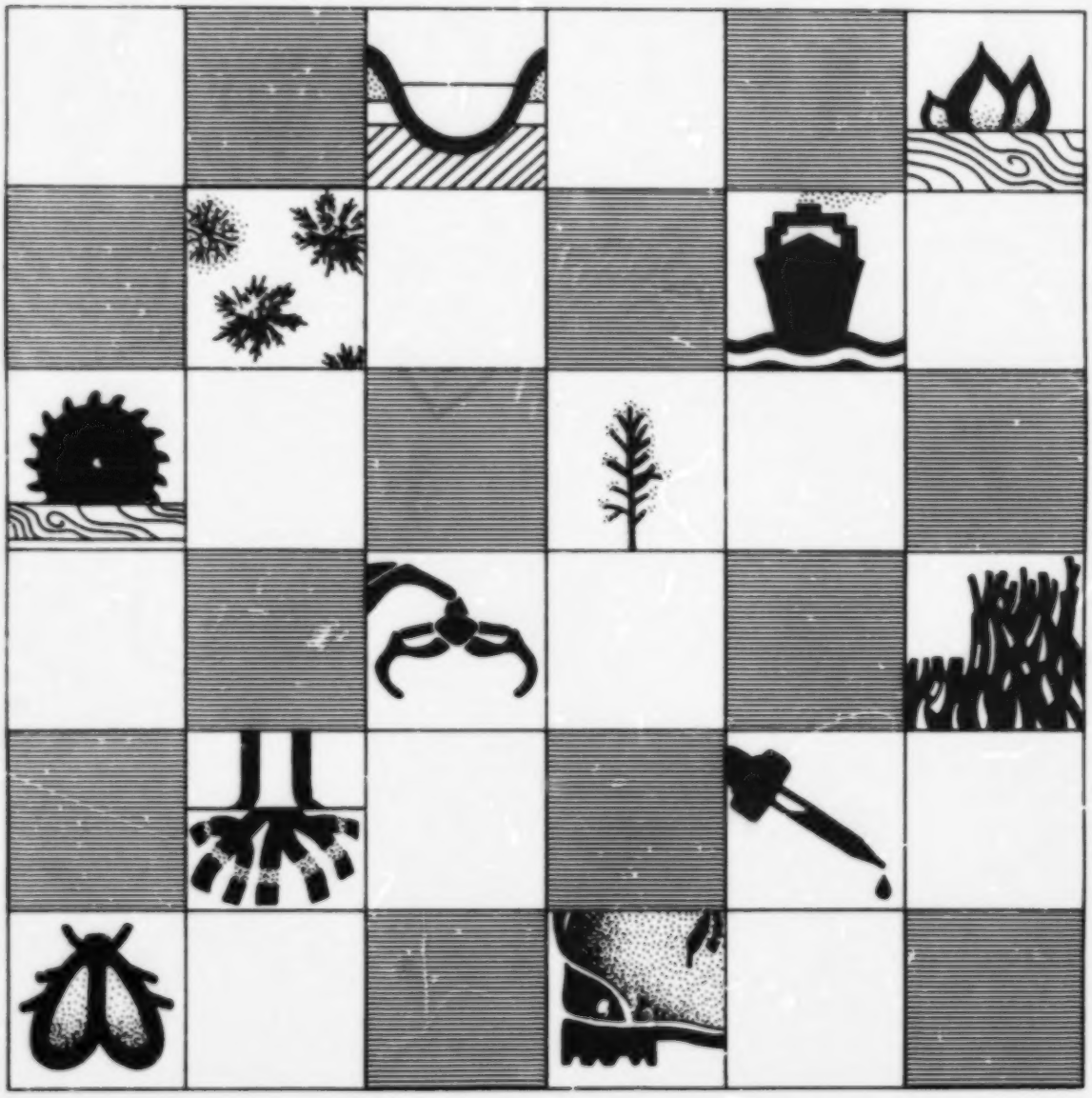

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Foreword

A list of recent publications from the Pacific Northwest Research Station is published four times a year. The fourth quarter list includes all publications produced by the Station during the year.

Publications are arranged under general subject categories and alphabetically by author within categories.

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Biological Control

Goldfarb, Barry; Nelson, Earl; Hansen, Everett NA

Trichoderma spp: distribution in Phellinus weirii--infested stumps and roots and antagonism in vitro. In: Thies, Walter G., comp. Proceedings, 33d annual western international forest disease work conference; 1985 September 24-27; Olympia, WA. Corvallis, OR: Oregon State University; 1985: 100-103.

Trichoderma spp. were found to be colonists of Douglas-fir stumps and root systems infested with Phellinus weirii. Trichoderma viride and T. polysporum were the most abundant species. These two species grew well in culture at 5-10 degrees Celsius, and they were effective antagonists of P. weirii at 10 degrees Celsius.

Keywords. Root rot, Phellinus weirii, fungus control/prevention.

Holsten, Edward H.; Werner, Richard A. NA

Evaluation of a controlled release formulation of methylcyclohexenone (MCH) in preventing spruce beetle attacks in Alaska. Tech. Rep. R10-12. Anchorage, AK: U.S. Department of Agriculture, Forest Service, Alaska Region, Forest Pest Management; 1985. 9 p.

A methylcyclohexenone (MCH) bubble cap (a controlled release device) was tested at two spacings (1 and 3 meters) for prevention of spruce beetle attacks in felled white spruce near Juneau Creek on the Chugach National Forest, Alaska. There were no significant differences in the suppression of beetle attacks between treated and felled check trees. Factors such as cool temperatures affecting expected release rates are discussed.

Keywords. Insect control (forest), spruce beetle, Dendroctonus rufipennis, Alaska (interior), interior Alaska.

Martignoni, Mauro E.; Iwai, Paul J. NA

Laboratory evaluation of new ultraviolet absorbers for protection of Douglas-fir tussock moth (Lepidoptera: Lymantriidae) Baculovirus. Journal of Economic Entomology. 78: 982-987; 1985.

Since 1972, a commercial catechin/leucocyanidin copolymer has been used as an ultraviolet (UV) absorber in spray mixes of TM BioControl-1, a viral preparation for control of Douglas-fir tussock moth. Because this copolymer is no longer manufactured, other materials were evaluated in the laboratory to find suitable substitutes compatible with the viral agent. Of the six new UV absorbers tested, two gave levels of protection from UV radiation equal or superior to the protection given by the catechin/leucocyanidin copolymer: a stilbene fluorescent whitening agent and a lignosulfonate. Both products are water soluble with pH near neutrality. These adjuvants are cost effective, but field tests are necessary before a product can be recommended for practical applications.

Keywords. Adjuvants, Baculovirus, virus (insect), nucleopolyhedrosis, insect control, Douglas-fir tussock moth.

Nelson, E.E.; Thies, W.G. NA

Inoculating Phellinus weirii-infested stumps with Trichoderma viride: a possible biological control for laminated root rot. In: Abstracts of papers: 4th international congress of plant patho'ogy; 1983 August 17-24; Melbourne, Victoria, Australia. [Place of publication unknown]: [Publisher name unknown]; 1983: [not paged]. Organized by: Australasian Plant Pathology Society on behalf of the International Society for Plant Pathology. Sponsored by: Australian Academy of Science. Abstract 961.

Trichoderma viride was successfully established in Douglas-fir stumps of trees harvested 1 year earlier. Three isolates of T. viride tested were equally effective. Pellets were little better inoculum than were dowels. Trichoderma spp. were isolated from 48 percent of points sampled in inoculated decayed stumps, 12 percent in stained stumps, and 2 percent in noninfested stumps. Colonization was best in October (29 percent), less in February (24 percent), and least in June (12 percent). Colonization increased with proximity to stump top, proximity to the inoculum, and extent of decay from which a sample was taken.

Keywords. Phellinus weirii, root rot, inoculum, biological control, Douglas-fir.

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Nelson, Earl E.; Thies, Walter G. NA
Trichoderma viride--a potential biological control for laminated root rot. In: Proceedings, 33d western international forest disease work conference; 1985 September 24-27; Olympia, WA. Corvallis, OR: Oregon State University; 1985: 107. Abstract.

Trichoderma viride was successfully established in Douglas-fir stumps of trees that had been harvested 1 year earlier. Three tested isolates of T. viride were equally effective. Pellets were better inoculum than were dowels. Trichoderma spp. were isolated from 48 percent of points sampled in inoculated decayed stumps, 12 percent in stained stumps, and 2 percent in noninfested stumps. Colonization was best in October (29 percent), less in February (24 percent) and least in June (12 percent). Colonization increased with proximity to stump top, proximity to the inoculum, and extent of decay the sample was taken from. Better colonization of lower stump and major roots is requisite to successful biological control.

Keywords. Root rot, Phellinus weirii, fungus control/prevention, biological control.

Economics in Wood Industry

Maki, Wilbur R.; Schallau, Con H; 85-096
Foster, Bennett B.; Redmond, Clair H.
South Carolina's forest products industry: performance and contribution to the State's economy, 1970 to 1980. Res. Pap. PNW-351. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station; 1986. 22 p.

Employment and earnings in South Carolina's forest products industry, like those of most Southern States, grew significantly between 1970 and 1980. The forest products industry accounted for a larger share of the State's economic base in 1980 that in 1970. Moreover, during this period, the State increased its share of the Nation's forest products industry employment and earnings. Pulp and allied products had the highest productivity, but lumber and wood products experienced the largest increase in productivity between 1972 and 1977.

Keywords. Forest products industries, economics (forest products industries), South Carolina.

Schallau, Con H; Maki, Wilbur R. 85-296
Economic impacts of interregional competition in the forest products industry during the 1970's: the South and the Pacific Northwest. Res. Pap. PNW-350. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station; 1986. 44 p.

Until the 1970's, the Pacific Northwest dominated national markets for softwood lumber and wood products. During the 1970's, however, the region's share declined, whereas production increased in the South. Meanwhile, the South's and the Pacific Northwest's shares of the Nation's employment in lumber and wood products declined. This resulted mainly from the increase in lumber imports from Canada and the construction of new, state-of-the-art plywood mills in the South. Trends in Canada and the South suggest that the Pacific Northwest could regain its dominant position as the supplier of solid softwood products. Although employment in the forest products industry will unlikely return to past levels, the industry will continue to play an important role in the economic growth and development of the region.

Keywords. Economic impact, interregional competition, economics (forest products industries), shift-share analysis, Canada, Pacific Northwest, South.

Schallau, Con H; Maki, Wilbur R.; 85-097
Foster, Bennett B.; Redmond, Clair H.
Kentucky's forest products industry: performance and contribution to the State's economy, 1970 to 1980. Res. Pap. PNW-354. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station; 1986. 22 p.

Employment and earnings in Kentucky's forest products, like those of most Southern States, grew significantly between 1970 and 1980. In fact, Kentucky's share of the Nation's forest products employment and earnings increased during this period. In 1980, lumber and wood products manufacturing accounted for the largest share of the industry's employment, but paper and allied products had more earnings. In 1977, pulp and allied products manufacturing had higher productivity than either lumber and wood furniture manufacturing.

Keywords. Forest products industries, economics (forest products industries), Kentucky.

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Ecosystem Function

Greene, Sarah E.; Klopsch, Mark 84-304
Soil and air temperatures for different habitats in Mount Rainier National Park. Res. Pap. PNW-342. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station; 1985. 50 p.

This paper reports air and soil temperature data from 10 sites in Mount Rainier National Park in Washington State for 2- to 5-year periods. Data provided are monthly summaries for day and night mean air temperatures, mean minimum and maximum air temperatures, absolute minimum and maximum air temperatures, range of air temperatures, mean soil temperature, and absolute minimum and maximum soil temperatures. A temperature growth index has also been calculated. Temperature lapse rates are given for one major drainage, Nisqually. The objective is to provide these data for the use of managers, field scientists, and modelers.

Keywords. Temperature (air), temperature (soil), habitat types, Washington (Mount Rainier Natl. Park), Mount Rainier Natl. Park--Washington.

Means, Joseph E.; Cromack, Kermit, Jr.; MacMillan, Paul C. NA
Biomass and element content of Douglas-fir logs in the western Cascades, Oregon. Bulletin of the Ecological Society of America. 65(2): 187-188; 1984. Abstract.

Keywords. Biomass, nutrient cycling, Douglas-fir.

Fire

Ottmar, Roger D. NA
Predicting fuel consumption by fire stages to reduce smoke from slash fires. In: Proceedings, Northwest Fire Council annual meeting; 1983 November 21-22; Olympia, WA. Portland, OR: Northwest Fire Council; 1983: 87-106.

The development and field use of large woody-fuel and duff consumption algorithms for broadcast burning of logged units in western Washington and Oregon are presented. The algorithms are preliminary and will be finalized in 1984. This quantitative system will allow managers to accurately predict fuel consumption by fire stages for developing prescribed fire strategies to reduce smoke emissions and accomplish planned silviculture and site preparation objectives.

Keywords. Fuel consumption, fire management, prescribed burning, smoke management, air pollution control.

Sandberg, David V. NA
Research leads to less smoke from prescribed fires. In: Proceedings, Northwest Fire Council annual meeting; 1983 November 21-22; Olympia, WA. Portland, OR: Northwest Fire Council; 1983: 107-121.

The Forest Residues and Energy Program of the USDA Forest Service, Pacific Northwest Research Station, Portland, Oregon, is midway in a 5-year research effort evaluating techniques to reduce air pollutant emissions from slash fires in western Washington and Oregon. Progress is reported on efforts to (1) develop on-site methods to measure flaming and smoldering fuel consumption, fire behavior, and emission characteristics; (2) demonstrate the effectiveness of emission-reduction techniques, especially increased yarding; (3) provide predictive equations for each parameter that can be managed to reduce emissions; and (4) present a predictive model to evaluate choices for reducing emissions. Preliminary results and guidelines are offered.

Keywords. Smoke management, prescribed burning, smoke control, air pollution control.

Ward, Darold E.; Hardy, Colin C. NA
Advances in the characterization and control of emissions from prescribed fires. In: Proceedings, 77th annual meeting, Air Pollution Control Association; 1984 June 24-29; San Francisco, CA. Pap. 84-36.3. Pittsburg, PA: Air Pollution Control Association; 1984. 32 p.

Work is summarized on evaluating emission reduction through utilization of residues and to characterize the emissions produced from broadcast burning of logging residues in western Washington and Oregon. Empirical data used to calibrate an exponential growth-decay model of the consumption of duff and woody fuels for four prescribed fires are presented. Emission factors are included. Several of the emissions are correlated with reaction intensity or combustion efficiency.

Keywords. Emissions, fire intensity, particulates, smoke control, fuel consumption, prescribed burning.

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Fish and Wildlife

Carey, A.B.; McLean, R.G. NA
The ecology of rabies: evidence of co-adaptation. Journal of Applied Ecology. 20: 777-800; 1983.

Rabies virus persists in diverse ecological communities, and patterns of incidence of infection, spread of virus, disease, and immunity differ among the communities. But these examples do not constitute a well-defined theory; they are merely possible explanations of some observed phenomena. Other explanations could be possible, but the classical view of rabies as a generally lethal, decimating, bite-transmitted disease does not apply to most persistent associations between host and parasite.

Keywords. Rabies, diseases (animal), virus diseases.

Carey, Andrew B. NA
A critical look at the issue of species-habitat dependency. In: New forests for a changing world: Proceedings, SAF national convention; 1983 October 16-20; Portland, OR. SAF 84-03. Bethesda, MD. Society of American Foresters; 1984: 346-351.

Federal regulations require forest managers to maintain viable populations of all species of wildlife that occur in National Forests. Attempts to determine minimum requirements for maintaining species can result in over- simplification of a species ecology and in failure to meet the regulations. A newly emerging discipline, landscape ecology, can provide a framework for identifying minimum requirements to forest management.

Keywords. Wildlife habitat management, wildlife habitat evaluation, habitat selection.

Larson, Frederic R.; Ffolliott, Peter F.; Clary, Warren P. NA
Managing wildlife habitat. Journal of Forestry. 84(3): 40-41; 1986.

University and Government researchers cooperated on studies in six watersheds of ponderosa pine in Arizona. The watersheds, located in the Coconino National Forest, approximately 50 kilometers south of Flagstaff, were examined for changes in wildlife habitat resulting from removing various degrees of the ponderosa pine overstory. Practical and effective guidelines were developed for enhancing wildlife habitat while manipulating forest stands to meet silviculture, range, or other objectives.

Keywords. Wildlife habitat management, ponderosa pine, Pinus ponderosa, Southwest.

Maser, Zane; Maser, Chris; Trappe, James M. NA
Food habits of the northern flying squirrel (Glaucomys sabrinus) in Oregon. Canadian Journal of Zoology. 63: 1084-1088; 1985.

Stomach contents and fecal pellets of 84 northern flying squirrels were analyzed for food habits, 23 from western Oregon and 61 from northeastern Oregon. The major foods were fungi and lichens. Twenty-two food items were identified, including 19 genera of hypogeous fungi.

Keywords. Animal diet, food habits (wildlife), squirrels, fungi (hypogeous), Oregon.

Mowrey, Robert A.; Zasada, John C. NA
Den tree use and movements of northern flying squirrels in interior Alaska and implications for forest management. In: Meehan, William R.; Merrell, Theodore R., Jr.; Hanley, Thomas A., eds. Fish and wildlife relationships in old-growth forests: Proceedings of a symposium; 1982 April 12-15; Juneau, AK. [Place of publication un- known]: American Institute of Fishery Research Biolo- gists; 1984: 351-356.

Twelve radiocollared flying squirrels in a white spruce forest in interior Alaska were tracked to 56 den trees on 85 observation days. Two hundred fifty-seven radio locations were obtained over 332 days in which 38 outside nests, all in spruce, were used and 18 inside nests in 9 birch, 8 aspen and 1 spruce were used. In summer, three female flying squirrels foraged at night around separate 2-kilometer circuits for about 6 hours. Forest management practices for flying squirrels in the taiga should include maintenance of red squirrel habitat and potential den trees with cavities and witches' brooms. Particular attention should be given to keeping cutting units small and maintaining relatively undisturbed corridors of trees for travel between denning sites and foraging areas. The group-selection silvicultural system appears to best meet requirements of both squirrel species and needs for regeneration and growth of the trees.

Keywords. Animal behavior, squirrels, Alaska (interior), interior Alaska.

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Ruggiero, Leonard F.; Carey, Andrew B. NA
A programmatic approach to the study of old-growth forest--wildlife relationships. In: New forests for a changing world: Proceedings, SAF national convention; 1983 October 16-20; Portland, OR. SAF 84-03. Bethesda, MD: Society of American Foresters; 1984: 340-345.

The USDA Forest Service's Old-Growth Forest Wildlife Habitat Research and Development Program was chartered to develop information that would help managers comply with the National Forest Management Act. The focus is on Pacific Northwest Douglas-fir old-growth forests (west of the Cascade Range from Canada to California)--their uniqueness, contribution to ecological diversity, and value to wildlife. The research approach consists of geographic stratification by five physiographic provinces with replicated community studies covering a broad range of moisture, temperature, and seral stages within each province. Ecological relationships evident from community studies will form the basis for species-specific studies wherein specific hypotheses will be tested and mechanisms of association elucidated. Studies of forest fragmentation will be integrated with other results to formulate recommendations for managing viable populations of plants and animals.

Keywords. Old-growth stands, wildlife habitat, National Forest administration, Pacific Northwest.

Toweill, Dale E.; Maser, Chris; NA
Johnson, Murray L.; Bryant, Larry D.
Size and reproductive characteristics of western Oregon cougars. In: Roberson, Jay; Lindzey, Frederick, comps. and eds. Proceedings, 2d mountain lion workshop; 1984 November 27-29; Utah: Zion National Park. Salt Lake City, UT: Utah Division of Wildlife Resources; 1984: 176-184. (Separates not available. Proceedings can be purchased from Utah Division of Wildlife Resources, 1596 W. North Temple, Salt Lake City, UT 84116. Price: $10.)

Cougars were collected from 1978-84 from the Cascade Range in Oregon by sport hunters and animal control personnel of the U.S. Department of the Interior, Fish and Wildlife Service. The sex ratio favored males (1.2 males:female) but did not differ significantly from 1:1. Females were more commonly killed during December and males were commonly taken during January. Male cougars averaged nearly 1.5 times the weight of females and were also significantly larger in total body length and hearth girth. Of 18 males whose testes were examined microscopically, 8 (44 percent) showed spermatozoa in the epididymides and were considered sexually mature. Reproductive tracts of 34 females were examined, 22 (65 percent) from animals believed to be adults. Over one-third of the 22 adult tracts examined showed no evidence of past reproductive activity. Mean litter size, based on placental scars present in the uteri of 11 cougars, averaged 2.8 kittens. Variability in numbers of Graafian follicies and corpora lutea precluded their use in estimation of individual fecundity.

Keywords. Game animals, animal reproduction, animal characteristics, cougars.

van Ballenberghe, Victor NA
Injuries to wolves sustained during live-capture. Journal of Wildlife Management. 48(4): 1425-1429; 1984.

This paper summarizes data on injuries to wolves captured for ecological studies in Minnesota and Alaska. It compares several capture techniques including trapping, snaring, and darting from a helicopter. Injuries to feet, legs, and oral tissues were highest with traps and lowest with helicopter darting. Advantages and disadvantages of each technique are discussed.

Keywords. Trapping (live), wolves, Minnesota, Alaska (interior), interior Alaska.

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General

Pacific Northwest Research Station 85-346
Publications of the Pacific Northwest Research Station, 1985. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station; 1985. 76 p.

Keywords. Bibliographies (forestry).

Zobel, Donald B.; Roth, Lewis F.; Hawk, Glenn M. 84-085
Ecology, pathology, and management of Port-Orford-cedar (Chamaecyparis lawsoniana). Gen. Tech. Rep. PNW-184. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station; 1985. 161 p.

Information about the biology, diseases, and management of Port-Orford-cedar was collected from the literature, from unpublished research data of the authors and the USDA Forest Service, from conversations with personnel involved in all facets of Port-Orford-cedar management, and from visits to stands throughout the range of the species. Information is presented regarding species characteristics, distribution, environment, vegetation, autecology, usage, and past management, and on the biology and effects of the most important pathogen. Recommendations for managing the species in the presence of this pathogen, Phytophthora lateralis, were developed. Presence of this introduced pathogen will complicate the management of Port-Orford-cedar and somewhat reduce the area where it can be grown, but production of future crops of cedar should be possible given careful, consistent application of the guidelines presented.

Keywords. Autecology, silvical characteristics, silviculture, root rot, ornamental trees, Port-Orford-cedar.

Genetics

Bey, Calvin F.; Houston, Daniel B.; Dinus, Ronald J. NA
Tree genetics and improvement. 1: The new genetics. Journal of Forestry. 84(1): 34, 36-37; 1986.

Keywords. Genetics (plant), tree improvement.

Bey, Calvin F.; Houston, Daniel B.; Dinus, Ronald J. NA
Tree genetics and improvement. 2: The business of tree improvement. Journal of Forestry. 84(2): 45; 1986.

Keywords. Genetics (plant), tree improvement.

Bey, Calvin F.; Houston, Daniel B.; Dinus, Ronald J. NA
Tree genetics and improvement. 3: Seed orchards. Journal of Forestry. 84(3): 27; 1986.

Keywords. Genetics (plant), tree improvement.

Campbell, R.K.; Sorensen, F.C. NA
Genetic implications of nursery practices. In: Duryea, Mary L.; Landis, Thomas D., es. Forest nursery manual: production of bareroot seedlings. Corvallis, OR: Oregon State University, Forest Research Laboratory; 1984: 183-191.

The genetic adaptation of forest trees to plantation sites can be impaired by nursery practices that favor the survival of some seedlings over others, thus producing a seedlot with a genetic makeup different from that of the original seedlot. Seed grading has considerable potential for directly altering the genetic mixture in the seedlot. Stratification period, sowing date, watering regime, lifting date, and other scheduling may have important but less direct influences on adaptation. For most seedlots, the risk of poor adaptation caused by nursery practices is probably no greater than risks caused by several current seed-collection practices. But for seedlots in which only a small percentage of seeds become seedlings that can survive outplanting, the risk may be as large as that in moving seeds between seed zones.

Keywords. Nursery methods, seed ecology, seed grading/sorting, stratification (seed), seeding date, adaptation (plant), genetics (plant).

Silen, Roy R.; Wanek, Jack NA
The J.E. Schroeder Forest Tree Seed Orchard in Oregon. Journal of Forestry. 84(3): 31-32, 35-37; 1986.

The J.E. Schroeder Forest Tree Seed Orchard complex (owned by the State of Oregon) is conceptually distinct. It expresses concepts of genetic quality and seed production of the Progressive Tree Improvement Program now initiated on 12 million acres of forest ownerships in Oregon and Washington. Each of the seven individual seed orchards at the 400-acre site are comprised of full siblings of selected parent trees. On-the-ground applications of many concepts--earlier gains, moving front, mass repositioning of orchard trees, weighted selection indices, between- and within-family selection, mass supplemental pollination, pollen contamination control, and precise adaptation for clinal variation within breeding zones--constitute an unusual, if not unique, combination of advanced practices.

Keywords. Seed orchards, genetics (plant), seedling production.

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Insects

Brookes, Martha H. NA
Program into print: literature emanating from the Douglas-fir tussock moth program, 1974-1978. Journal of Research Communication Studies. 3: 253; 1981. Abstract.

Examples of publications from the U.S. Department of Agriculture Expanded Douglas-fir Tussock Moth Research and Development Program are listed with brief description of the audiences for whom they are intended.

Keywords. Publications, research programs, research planning, Douglas-fir tussock moth.

Hard, John S. 83-232
Spruce beetles attack slowly growing spruce. Forest Science. 31(4): 839-850; 1985.

White spruce stands were examined in 1982 for patterns of mortality of trees in a vigorous spruce beetle infestation on the Kenai Peninsula of Alaska. Mean recent radial growth adjusted for diameter of unattacked trees on 25 initial plots was higher than mean adjusted radial growth of attacked but unkilled or beetle-killed trees. Mean adjusted radial growth of trees killed by beetles in 1982 did not differ significantly from mean adjusted radial growth of trees killed before 1982, but mean adjusted radial growth of trees attacked but unkilled in 1982 was significantly higher than mean adjusted radial growth of trees killed by beetles before 1982. In addition, trees killed in 1982 on 17 supplemental plots sampled in 1983 differed significantly from trees attacked but unkilled in 1982 by mean rate of successful attacks and by mean recent radial growth, but not by mean diameter. Larger mean stand diameters and rapid recent radial growth of spruce occurred in stands with lower stocking levels. Results suggest that stand resistance to spruce beetles could be enhanced by decreasing stocking to reduce competition and increases vigor of residuals.

Keywords. Insect damage (-forest, insect outbreaks, stocking density, spruce beetle, white spruce, Alaska.

Torgersen, Torolf R. NA
A new Hyposoter (Hymenoptera: Ichneumonidae) from Orgyia pseudotsugata (McD.) (Lepidoptera: Lymantriidae). Canadian Entomologist. 117: 941-947; 1985.

A new species of Hyposoter Foerster from western North America is described based on features of the adult, final-instar cephalic structure, cocoon, and biology. Hyposoter masoni n. sp. is a common parasite of the Douglas-fir tussock moth, Orgyia pseudotsugata.

Keywords. Parasites (insect) (-forest pest control, Douglas-fir tussock moth, Orgyia pseudotsugata.

Tunnock, Scott; Ryan, Roger B. 83-077
Larch casebearer in western larch. For. Insect & Dis. Leafl. 96. Washington, DC: U.S. Department of Agriculture, Forest Service; 1985. 8 p.

Keywords. Larch casebearer, insect populations, insecta, insect control.

Logging

Harris, A.S.; Williamson, Richard L. NA
Feasibility of partial cutting old-growth stands in the western hemlock-Sitka spruce forest type of southeast Alaska. In: Science in the North: Proceedings, 33d Alaska science conference; 1982 September; Fairbanks, AK. [Place of publication unknown]: American Association for the Advancement of Science, Arctic Division; 1982: 160. Abstract.

Clearcutting has been used exclusively to harvest old-growth timber in the western hemlock-Sitka spruce stands of southeast Alaska, but it is sometimes inappropriate. Some form of partial cutting may provide a suitable alternative whereby a considerable amount of timber could be harvested that otherwise would not be available for industry. The feasibility of partial cutting is currently being tested.

Keywords. Old-growth stands, clearcutting, partial cutting, timber harvest planning, Sitka spruce, western hemlock, Alaska (southeast), southeast Alaska.

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Hartsough, Bruce R.; Miles, John A. NA
Applying virtual work relationships to a two-dimensional cable logging system. Transactions of the ASAE. 28(5): 1358-1362; 1985.

Equilibrium relationships were derived for a two-dimensional cable logging system using the principle of virtual work. The approach easily yielded a small set of equations that were solved simultaneously for different sets of unknowns as the sets changed during a yarding cycle. The virtual work method had advantages over the force balance approach and is expected to have similar benefits when applied to three-dimensional systems.

Keywords. Cable logging, cable skidding equipment, skyline logging.

Hartsough, Bruce R.; Miles, John A. NA
Comparison of static models for cable logging systems. Pap. 85-1615. St. Joseph, MI: American Society of Agri- cultural Engineers; 1985. 15 p.

Models for the analysis of cable systems were compared: rigid link, two hybrid catenary-rigid link, and virtual work formulations. Errors produced by the approximate models were analyzed using catenary analysis as the exact standard. One of the hybrid models gave the most accurate results. Although the virtual work model did not perform as well as the others, magnitudes of error were low enough to make it or any of the models acceptable for most purposes.

Keywords. Models, logging systems, skyline logging, cable logging.

Hinton, Laura G.; Gibson, H.G.; NA
Krutz, G.W.
Tractor logging simulation: overcoming terrain obstacle problems. Pap. 85-1606. St. Joseph, MI: American Soci- ety of Agricultural Engineers; 1985. 7 p.

This paper describes the development of a ground-based harvesting simulator developed for a desktop microcomputer. This simulation of tractor logging incorporates a method of handling terrain obstructions on harvest sites such as rock ledges, streams, and other areas that cannot be traversed. In addition, the simulator works in conjunction with a digital terrain model (DTM).

Keywords. Computers (desktop), simulation, logging system, tractor skidding.

Miyata, Edwin S.; Ortman, Thomas L.; NA
Clemens, Paul J.
Reliability of rockbolt anchorages for forestry applications. In: Improving mountain logging planning, techniques and hardware: Proceedings, joint symposium of the I.U.F.R.O. Mountain Logging Section and the 6th Pacific Northwest skyline logging symposium; 1985 May 8-11; Vancouver, BC. Vancouver, BC: Forest Engineering Research Institute of Canada; 1985: 97-100.

Rockbolt anchors have been widely used for many years by the mining and construction industries. The use of rockbolt anchors in logging operations, however, has been limited. This paper discusses techniques for installing rockbolts and the cost of installation, and presents the results of pullout tests of different length rockbolts in two types of rock formations. The holding capacity of these rock formations ranged from 76 to more than 490 kilonewtons.

Keywords. Anchors, logging operations, mountain logging.

Mensuration

Hoyer, Gerald E. 85-037
Tree form quotients as variables in volume estimation. Res. Pap. PNW-345. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station; 1985. 16 p.

The study reviews Hohenadl's procedure for defining form quotients and tree volume from diameters measured at fixed proportions of total tree height. Modifications of Hohenadl's procedure were applied to two sets of data for western hemlock from the Pacific Northwest. The procedure was used to define volume differences in thinned stands, and selected form quotients were used as variables to improve accuracy and precision of standard tree volume equations. Estimating form quotients on standing trees requires less time than complete stem dendrometry. The technique has application to other tree species.

Keywords. Volume estimation, volume equations, form factors, form quotient, western hemlock.

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McKay, Neil 85-087
A stockability equation for forest land in Siskiyou County, California. Res. Note PNW-435. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station; 1985. 6 p.

An equation is presented that estimates the relative stocking capacity of forest land in Siskiyou County, California, from the amount of precipitation and the presence of significant indicator plants. The equation is a tool for identifying sites incapable of supporting normal stocking. Estimated relative stocking capacity may be used to discount normal yields to levels that these sites can produce.

Keywords. Stocking level, indicator plants, yield (forest), California.

Pong, W.Y.; Waddell, Dale R.; 85-032
Lambert, Michael B
Wood density-moisture profiles in old-growth Douglas-fir and western hemlock. Res. Pap. PNW-347. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station; 1986. 30 p.

Accurate estimation of the weight of each load of logs is necessary for safe and efficient aerial logging operations. The prediction of green density (pounds per cubic foot) as a function of height is a critical element in the accurate estimation of tree bole and log weights. Two sampling methods, disk and increment core (Bergstrom xylodensimeter), were used to measure the density-moisture complex in wood. The relationship between wood density and height was best described by either quadratic or cubic polynomial functions. Prediction functions for green and dry wood density are presented for old-growth western hemlock and Douglas-fir. Sapwood and heartwood functions were analyzed separately as were trees with and without heartrot.

Keywords. Wood density, moisture content (wood), old-growth stands, Douglas-fir, western hemlock.

Slaughter, C.W.; Werner, R.A.; NA
Haugen, R.K.
Constraints and approaches in high latitude natural resources sampling and research. In: LaBau, Vernon J.; Kerr, Calvin L., eds. Inventorying forest and other vegetation of the high latitude and high altitude regions: Proceedings of an international symposium, Society of American Foresters regional technical conference; 1984 July 23-26; Fairbanks, AK. SAF Publ. 84-11. Bethesda, MD: Society of American Foresters; 1984: 41-46.

High-latitude regions present operational constraints for natural resource inventory and research: short growing season, extended seasonal snow cover, permafrost, low winter temperatures, restricted transportation, high costs, and sparse information base. Constraints may be reduced by: use of solid state and/or simple mechanical instruments, extrapolation of data, reliance on permanent study sites dedicated to long-term environmental monitoring, alternative travel methods, aerial photography/remote sensing, and cooperation among agencies.

Keywords. Boreal forests, sampling methods, survey methods/planning, field techniques, Alaska.

Mount St. Helens

Frenzen, P.; Franklin, J. NA
Conifer establishment from seed on ash from Mt. St. Helens. In: Program and abstracts; 56th annual meeting, Northwest Scientific Association; 1983 March 24-26; Olympia, WA. [Place of publication unknown]: [Publisher name unknown]; 1983: not paged. Abstract 189.

Keywords. Regeneration (natural), tephra, seed survival, volcano effects, volcanic ash soil, Washington (Mount St. Helens), Mount St. Helens--Washington.

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Hinckley, Thomas M.; Imoto, Hiromi; NA
Lee, Katharine [and others]
Impact of tephra deposition on growth in conifers: the year of the eruption. Canadian Journal of Forest Research. 14: 731-739; 1984.

Seven sites ranging from 15 to 135 kilometers from Mount St. Helens in southwest Washington were selected to study the impact of air-fall tephra on growth of Pacific silver fir, noble fir, Douglas-fir, western hemlock, and mountain hemlock. As depth of tephra increased, there was a corresponding increase in visible foliar damage and associated decreases in diameter and height growth. Reduction in diameter growth was greater than reduction in height growth. The reduction in diameter growth approached 50 percent in both trees and saplings of Pacific silver fir. Growth reduction to true firs was greater than in associated species. This difference was related to their greater capacity for interception and retention of air-fall tephra. Damage to trees and resulting growth reductions were caused by tephra covering both the foliage and the soil. Coverage of the foliage resulted in foliar damage, foliage abscission and reduction of total tree foliar area, and increased mortality of fine roots. Tephra coverage of the soil had the potential to restrict oxygen diffusion into the soil; however, soil oxygen concentrations less than 10 percent were measured only once over a 2-year period.

Keywords. Volcano effects, tephra, increment, Washington (Mount St. Helens), Mount St. Helens--Washington.

Means, Joseph E.; Franklin, Jerry F. NA
Natural revegetaiton [revegetation] of the uplands in the northeastern portion of the area devastated by Mount St. Helens. In: Program and abstracts; 56th annual meeting, Northwest Scientific Association; 1983 March 24-26; Olympia, WA. [Place of publication unknown]: [Publisher name unknown]; 1983: not paged. Abstract 194.

Keywords. Revegetation, natural revegetation, volcano effects, Mount St. Helens--Washington, Washington (Mount St. Helens).

Mycorrhizae

Fogel, Robert; Trappe, James M. NA
Destuntzia, a new genus in the Hymenogastraceae (Basidiomycotina). Mycologia. 77(5): 732-742; 1985.

A new genus in the Hymenogastraceae, Destuntzia, is created to accommodate two species formerly placed in Hymenogaster, H. ruber and H. subborealis, and three previously undescribed species, D. fusca, D. saylorii, and D. solstitialis. Destuntzia is characterized by the locules lacking an organized hymenium and being filled with a gel containing pigmented, verrucose to rugulose spores.

Keywords. Ectomycorrhizal fungi, taxonomy (fungi).

Physiology

Knutson, Donald M. NA
Physiology of mistletoe parasitism and disease responses in the host. In: Calder, Malcolm; Bernhardt, Peter, eds. The biology of mistletoes. Sydney; New York: Academic Press; 1983: 295-316.

Mistletoes in 75 genera parasitize food and fiber trees throughout the world. The parasites cause abnormal cell division and respiration of host trees. Loss of host food to the parasites and excessive transpiration of host water result in dieback of twigs, thin crowns and small fruits that typically characterize mistletoe infections.

Keywords. Parasites (plant), diseases (plant), mistletoe.

Radwan, M.A.; Johnson, D.W. NA
Fertilization of red alder seedlings. In: Program and abstracts: 58th annual meeting, Northwest Scientific Association; [Dates of meeting unknown]; [Place of meeting unknown]. [Place of publication unknown]: [Publisher name unknown]; 1985: not paged. Abstract 69.
Keywords. Fertilizer response, seedling growth, red alder.

Radwan, M.A.; Kraft, J.M. NA
Silen, R.R.; DeBell, D.S.
Family variation in growth and foliar nutrients of Douglas-fir with and without nitrogen fertilizer. In: Proceedings, 8th North American forest biology workshop; [Date of meeting unknown]: [Place of meeting unknown]. Logan, UT: Utah State University; 1984: 158-159. Abstract.

Keywords. Nitrogen fertilizer response, tree families, increment, Douglas-fir.

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Radwan, M.A.; Shumway, J.S. NA
Effects of N, S, and P nutrition on growth and nutrient content of Douglas-fir seedlings. Plant Physiology. 75(1): 90; 1984 (Suppl.). Abstract 509.

Keywords. Nitrogen fertilizer response, seedling growth, nutrient elements (plant), Douglas-fir.

Plant Ecology

Franklin, Jerry F.; Klopsch, Mark; Luchessa, Karen J. NA
Timing and causes of mortality in natural coniferous forests of Oregon and Washington. Bulletin of the Ecological Society of America. 65(2): 206-207; 1984. Abstract.

Keywords. Mortality, coniferae.

Frenzen, Peter M.; Franklin, Jerry F. 83-321
Establishment of conifers from seed on tephra deposited by the 1980 eruptions of Mount St. Helens, Washington. The American Midland Naturalist. 114(1): 84-97; 1985.

Information concerning the factors controlling seedling establishment on tephra deposits (airfall volcanic ejecta) is limited. The establishment and growth of six coniferous species--Pacific silver fir, noble fir, western white pine, lodgepole pine, Douglas-fir, western hemlock--are assessed as a function of: (1) depth of tephra deposit, (2) condition of surface crust, and (3) availability of shade on seedbed. In October 1980, seeds were planted on four sites 20 kilometers northeast of Mount St. Helens, in southwest Washington, in a split-split plot design that incorporated plantings both on tephra deposited May 18, 1980, and on pre-eruption soil. All six species established themselves from seed on tephra deposits less than 20 centimeters deep. Cultivation of the tephra surface crust yielded more established seedlings than either total removal of tephra deposit or untreated tephra. Where differences between species were significant, Douglas-fir was tallest and western hemlock the shortest of the species tested. Seedlings grown on tephra were generally shorter than those grown on underlying soil, regardless of surface treatment. The principal factors affecting seedling establishment in this study were: (1) loss of seed prior to germination, (2) failure of germinating seeds to penetrate the surface crust of the tephra, and (3) the occurrence of extended drought and/or extreme surface temperatures.

Keywords. Seedling establishment, regeneration (artificial), volcano effects, tephra, Washington (Mount St. Helens), Mount St. Helens--Washington, coniferae.

Greene, Sarah E. NA
Forest structure and dynamics in an Oregon coast Tsuga heterophylla-Picea sitchensis forest. Bulletin of the Ecological Society of America. 65(2): 207; 1984. Abstract.

Keywords. Stand structure, mortality, stand conditions.

Halpern, Charles B. NA
Twenty years of plant succession following logging and burning of Douglas-fir forests in the central western Cascades of Oregon. Bulletin of the Ecological Society of America. 65(2): 150; 1984. Abstract.

Keywords. Succession, Douglas-fir, Pseudotsuga menziesii.

Halpern, Charles B. NA
Hydric montane meadows of Sequoia National Park, California: a literature review and classification. Tech. Rep. 20. Davis, CA: University of California, Cooperative National Park Resources Studies Unit; San Francisco, CA: U.S. Department of the Interior, National Park Service, Western Region; 1985. 84 p.

A vegetation classification was developed for montane meadows of Sequoia and Kings Canyon National Parks based on 81 releve samples during September 1982. Twelve plant associations were recognized and described floristically and ecologically. Major environmental factors influencing vegetation distribution include: (1) a complex moisture gradient incorporating water table depth and movement, and (2) site exposure and shading. Sampling of microenvironmental factors during 1983 indicates that seasonal water table dynamics are important in structuring the vegetation. Community distribution also reflects spatial differences in soil water oxygen. The classification of montane meadows provides baseline data for resource managers and complements similar subalpine work from the southern Sierra Nevada.

Keywords. Vegetation classes, montane meadows, National Parks, California.

Harmon, Mark E. NA
Logs as sites of tree regeneration in Picea sitchensis-Tsuga heterophylla forests of coastal Washington and Oregon. Bulletin of the Ecological Society of America. 65(2): 208-209; 1984. Abstract.

Keywords. Regeneration (natural), seed beds.

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Hawk, G.M.; Long, J.N.; Franklin, J.F. NA

Relations between vegetation and environment. In: Edmonds, Robert L., ed. Analysis of coniferous forest ecosystems in the western United States. US/IBP Synthesis Ser. 14. Stroudsburg, PA: Hutchinson Ross Publishing Company; 1982: 28-44.

The synthesis of recent International Biosphere Program studies regarding terrestrial producers is reviewed. Work done in vegetation description and environmental correlation at the Cedar River watershed, Washington, and the H.J. Andrews Experimental Forest, Oregon, is summarized. Forest habitat types are found to respond to various environmental gradients such as moisture, temperature, and depth and duration of snowpack.

Keywords. Forest types, forest biome, vegetation types, site factors, Washington (Cedar River), Oregon (H.J. Andrews Exp. For), Cedar River--Washington, H.J. Andrews Exp. For.--Oregon.

Minore, D. NA

Effects of chinkapin, tanoak, and madrone stump sprouts on soil moisture, soil temperature, and light intensity. In: Program and abstracts, Northwest Scientific Association and Montana Academy of Sciences conference; 1984 March 21-14; Missoula, MT. [Place of publication unknown]: [Publisher name unknown]; 1984: not paged. Abstract 208.

Keywords. Soil moisture, soil temperature, light intensity (solar), stump analysis, sprouting.

Smith, Bradley G. NA

Vegetation and diversity along a river terrace chronosequence, Hoh River, Olympic National Park, WA. Bulletin of the Ecoiogical Society of America. 65(2): 66; 1984. Abstract.

Keywords. Forest types, Washington (Olympic Natl. Park), Olympic Natl. Park--Washington.

Plant Pathology

Eslyn, Wallace E.; Aho, Paul E. NA

Decay capacities and interactions between isolates of an unidentified basidiomycete and Echinodontium tinctorium Ell. & Ev. obtained from suppressed grand fir. Canadian Journal of Forest Research. 12(2): 413-416; 1982. (Abstract also published elsewhere: Eslyn, Wallace E.; Aho, Paul E. Interaction between Echinodontium tinctorium Ell. & Ev. and an unknown basidiomycete from suppressed Abies grandis (Doug.) Lindl. Phytopathology. 71(10): 111; 1981. Abstract.)

In vitro tests of an unidentified basidiomycete isolated from suppressed grand fir regeneration indicate that it prevented decay by Echinodontium tinctorium by imparting an antibiotic in wood.

Keywords. Decay (wood), decay fungi (wood), fungi (-wood deterioration, heart rot, Echinodontium tinctorium, basidiomycetes, grand fir, Abies grandis.

Hennon, Paul E.; Shaw, Charles G., III; Hansen, Everett NA

Is a pathogen the primary cause of decline and mortality of Chamaecyparis nootkatensis in southeast Alaska? In: Proceedings, 32d WIFDWC meeting; 1984 September 25-28; Taos, NM. [Place of publication unknown]: [Publisher name unknown]; 1984: 15-23.

Keywords. Diseases (plant), mortality, Alaska-cedar, Alaska (southeast), southeast Alaska.

Miller, Donald J.; Knutson, Donald M.; Tocher, Richard D. NA

Chemical brown staining of Douglas-fir sapwood. Forest Products Journal. 33(4): 44-48; 1983.

The cause of brown staining of Douglas-fir sapwood is unknown and cannot be corrected by surface treatments. Raising fresh sapwood to 212 degrees Fahrenheit by steaming in kilns is an effective preventative.

Keywords. Fungus control/prevention, sapwood, Douglas-fir.

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Nelson, E.E.; Thies, W.G.; Li, C.Y. 85-225

Are seed and cone pathogens causing significant losses in Pacific Northwest seed orchards? Res. Note PNW-436. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station; 1986. 5 p.

Cones systematically collected in 1983 from eight Douglas-fir seed orchards in western Washington and Oregon yielded large numbers of common molds. Fungi isolated from apparently healthy, developing cones were similar to those from necrotic cones. Necrosis in cones aborted in early stages of development was apparently not associated with pathogenic fungi or bacteria. Environmental factors appeared to account for early cone abortions, although on-site temperatures were not recorded, nor were those fungi isolated from aborted cones tested for pathogenicity. Necrotic areas in cones collected during the summer were associated with insect acitivity. Good crops of healthy cones were produced when fertilization and partial girdling has been used to stimulate cone production and insecticides used to control cone insects.

Keywords. Diseases (cone), diseases (seed), orchards (seed), Pacific Northwest, Douglas-fir.

Shaw, Charles G., III; Stage, Albert R.; Webb, Timothy M. NA

Development of a root disease subroutine for use with stand growth models of western forests. In: Thies, Walter G., comp. Proceedings, 33d annual western international forest disease work conference; 1985 September 24-27; Olympia, WA. Corvallis, OR: Oregon State University; 1985: 48-54.

This paper discusses the modeling effort the USDA Forest Service is sponsoring on root diseases in western forests: why the model is being developed, how it is being constructed, what it does, and how it might be used in management of forest lands affected by root disease. Additional information on the purpose, construction, and use of this model appears in the August 1985 issue of Forestry Research West.

Keywords. Models, root root, growth models, Armillaria, Phellinus weirii.

Tait, Susan M.; Shaw, Charles G., III; Eglitis, Andris 85-008

Occurrence of insect and disease pests on young-growth Sitka spruce and western hemlock in southeastern Alaska. Res. Note PNW-433. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station; 1985. 16 p.

Insects and diseases were surveyed in 16 even-aged, young-growth stands of Sitka spruce and western hemlock in southeastern Alaska. All stands appeared healthy. Although some organisms with damage potential were observed, no pests occurred at levels likely to cause damage. The most notable of the organisms found were Armillaria sp. and F. annosus in thinning stumps; Zeiraphera in spruce buds (the first record of this insect in southeastern Alaska); and Pseudohylesinus tsugae in hemlock stems.

Keywords. Insect surveys, diseases (plant), young-growth stands, Sitka spruce, western hemlock, Alaska (southeast), southeast Alaska.

Thies, Walter G., comp. NA

Proceedings of the 33d annual western international forest disease work conference; 1985 September 24-27; Olympia, WA. Corvallis, OR: Oregon State University; 1985. 160 p.

Keywords. Pathology (forest), diseases (plant), fungi, fungus control/prevention.

Thies, Walter G.; Hansen, Everett M. NA

Bulldozing to control laminated root rot--another consideration. In: Thies, Walter G., comp. Proceedings, 33d annual western international forest disease work conference; 1985 September 24-27; Olympia, WA. Corvallis, OR: Oregon State University; 1985: 104-105.

Bulldozing Phellinus weirii-infested Douglas-fir stumps leaves broken, infested root pieces in the soil. Longevity of the fungus in root pieces was tested by burying and later examining naturally infested roots on a site near Hoodsport, Washington. Eight years after burial the fungus could be cultured from 46 percent of the recovered pieces, the smallest of which was 1.3 centimeters in diameter. Removal of bark before burial did not cause the pathogen to be eliminated.

Keywords. Root rot, Phellinus weirii, fungus control/prevention.

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Range Management

Bryant, Larry D. 85-080
Livestock management in the riparian ecosystem. In: Johnson, R. Roy; Ziebell, Charles D.; Patton, David R. [and others], tech. coords. Riparian ecosystems and their management: reconciling conflicting uses: Proceedings, 1st North American riparian conference; 1985 April 16-18; Tucson, AZ. Gen. Tech. Rep. RM-120. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station; 1985: 285-289.

Intensive, long-term livestock grazing has occurred along most streams in the western United States. Although most livestock grazing on public lands is now under some form of management, many riparian areas are below "good" in ecologic condition, with forage production considerably below potential. Eight years of research at Meadow Creek, Starkey Experimental Forest and Range, Wallowa-Whitman National Forest, in northeastern Oregon, indicates that herbage production was increased 1- to 4-fold through timing and intensity of grazing. Rest-rotation, deferred rotation, and season-long grazing systems were tested. Although there were no statistically different changes in plant composition, the production of both graminoids and forbs increased dramatically.

Keywords. Grazing management, grazing systems, riparian vegetation, forage production, Starkey Exp. For.--Oregon, Oregon (Starkey Exp. For.).

Edgerton, Paul J.; Lopushinsky, William NA
Fertilization and seeding trials on burned elk winter range in eastern Washington. In: Abstracts, 39th annual meeting of the Society for Range Management; 1986 February 9-14; Kissimmee, FL. Denver, CO: Society for Range Management; 1986: 269. Abstract 270.

Keywords. Winter range, fertilizer trials, seeding trials, elk.

Greene, Sarah E. NA
New rangeland research areas in Oregon. Rangelands. 7(4): 165-166; 1985.

Thirteen new Research Natural Areas have been established by the Bureau of Land Management (U.S. Department of the Interior) in eastern Oregon. These areas provide new opportunities for range research and baseline monitoring. The Research Natural Area Program is described briefly.

Keywords. Range management, natural areas (research).

Hall, Frederick C. 85-317
Wildlife habitats in managed rangelands--the Great Basin of southeastern Oregon: management practices and options. Gen. Tech. Rep. PNW-189. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station; 1985. 17 p.

Relationships of selected species of wildlife to manipulations of habitat in managed rangelands are discussed. Options and consequences of simultaneous planning for wildlife habitat and livestock production are given.

Keywords. Wildlife habitat management, range management, livestock, Oregon (Great Basin), Great Basin--Oregon, series (Great Basin habitats).

Recreation

Christensen, Harriet H.; Davis, Nanette J. NA
Evaluating user impacts and management controls: implications for recreation choice behavior. In: Stankey, George H.; McCool, Stephen F., comps. Proceedings, symposium on recreation choice behavior; 1984 March 22-23; Missoula, MT. Gen. Tech. Rep. INT-184. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station; 1985: 71-78. (Copies of proceedings available from: Intermountain Research Station, Forest Service Building, 507-25th Street, Ogden, UT 84401.)

This paper describes potential factors affecting recreation choice behavior. Freedom and lack of constraints are experiences frequently sought by recreationists. Data in the paper are based on questionnaires completed by agency managers and informal conversations with users in the Mount Rainier area of Washington State. Managers' and users' perceptions of impacts such as vandalism, theft and littering, and social control practices are described for developed and semi-developed campgrounds. Implications of impacts and regimentation for recreation choice behavior are discussed.

Keywords. Recreationists, depreciative behavior, vandalism, user effects.

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Clark, Roger N.; Downing, Kent B. NA
Why here and not there: the conditional nature of recreation choice. In: Stankey, George H.; McCool, Stephen F., comps. Proceedings, symposium on recreation choice behavior; 1984 March 22-23; Missoula, MT. Gen. Tech. Rep. INT-184. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station; 1985: 61-70. (Copies of proceedings available from: Intermountain Research Station, Forest Service Building, 507-25th Street, Ogden, UT 84401.)

This paper reports results of several studies to identify the state of the art and direction of research on how recreationists make choices. Findings from the studies have been combined into a list of propositions; the propositions can be considered hypotheses from which future studies can be developed or the effect of management activities on choices can be evaluated. Concepts that underlie recreation choices are illustrated. The complex and diverse nature of the recreationists' decisionmaking process supports a grounded approach in future investigations

Keywords. Recreation, recreationists, recreation management.

Downing, Kent B.; Clark, Roger N. NA
Methodology for studying recreation choice behavior with emphasis on grounded inquiry. In: Stankey, George H.; McCool, Stephen F., comps. Proceedings, symposium on recreation choice behavior; 1984 March 22-23; Missoula, MT. Gen. Tech. Rep. INT-184. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station; 1985: 101-106. (Copies of proceedings available from: Intermountain Research Station, Forest Service Building, 507-25th Street, Ogden, UT 84401.)

This paper reports methodology for investigating recreation choice behavior using grounded, naturalistic research methods. How these techniques can be coordinated with other social research methods is described. Naturalistic methods are preferred over other approaches to uncover recreationists' decisionmaking processes at work.

Keywords. Recreation, recreationists, research.

Regeneration

Edgerton, P.J.; Lopushinsky, W. NA
Fertilization and seeding trials on burned elk winter range in north-central Washington. In: Program and abstracts; 56th annual meeting, Northwest Scientific Association; 1983 March 24-26; Olympia, WA. [Place of publication unknown]: [Publisher name unknown]; 1983: not paged. Abstract 148.

Keywords. Fertilizer response, range fertilization, seeding trials, winter range, wildlife habitat, revegetation (range).

Froehlich, Henry A. NA
Soil compaction from logging equipment: effects on growth of young ponderosa pine. Journal of Soil and Water Conservation. 1979 November-December: 276-278.

Growth rates of 22-year-old western hemlock were reduced 15 percent when moderate soil compaction in the root zone occurred during commercial thinning with small tractors.

Keywords. Soil compaction, logging (-forest damage, skidding tractors, growth rate.

Jaramillo, Annabelle E. NA
Predicting cold hardiness of Douglas-fir nursery stock with an oscilloscope/square-wave apparatus. Tree Planters' Notes. 35(2): 25-27; 1984.

Oscilloscope/square-wave apparatus was not useful in predicting the cold hardiness of Douglas-fir nursery stock. No correlations were observed between square-wave trace form and damage or kill in seedlings subjected to freezing tests.

Keywords. Temperature effects, cold resistance (plant), seedling survival, plant dormancy, nursery stock, Douglas-fir, Pseudotsuga menziesii.

Minore, D. NA
Seed and seedling survival on two habitat types in the upper McKenzie basin. In: Program and abstracts; 55th annual meeting, Northwest Scientific Association; 1982 March 17-19; College Place, WA. [Place of publication unknown]: [Publisher name unknown]; 1982: not paged. Abstract 62.

Keywords. Regeneration (natural), seed survival, seedling survival, coniferae.

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Minore, Don 85-052

Germination, survival and early growth of conifer seedlings in two habitat types. Res. Pap. PNW-348. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station; 1986. 25 p.

Conifer seeds were sown in clearcut Abies amabilis/Achlys triphylla and Abies amabilis/Vaccinium membranaceum/Xerophyllum tenax habitat types in the McKenzie River basin in Oregon to determine ratios of seeds to established seedlings. Protection from animal predation and shade from stumps were beneficial, but survival and growth did not differ significantly between habitat types or among humus treatments. Germination in the greenhouse was earlier and more prolonged on soils from the Achlys type.

Keywords. Seedling growth, habitat types, seedling survival, germination (seed).

Stein, William I. NA

Fixed-plot methods for evaluating forest regeneration. In: Abstract preview, SAF national convention; 1983 October 16-20; Portland, OR. Bethesda, MD: Society of American Foresters; 1983: 6. Abstract.

Keywords. Regeneration survey, sample plots, sampling design.

Stein, William I. 85-288

Regeneration outlook on BLM lands in the Siskiyou Mountains. Res. Pap. PNW-349. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station; 1986. 104 p.

A survey of timberland cutover from 1956 to 1971 in the Applegate, Evans, and Galice-Glendale areas of southwestern Oregon showed that both partial cuts and clearcuts were well stocked with a combination of regeneration that started before and after harvest cutting. Stocking differed significantly by forest type, soil type, soil series, soil origin, soil depth, and stream drainage and correlated with an array of environmental variables.

Keywords. Regeneration (stand), regeneration (natural), regeneration (artificial), clearcutting systems, partial cutting, stand development, Oregon (southwest), southwest Oregon.

Tinnin, Robert O.; Kirkpatrick, Lee Ann NA

The allelopathic influence of broadleaf trees and shrubs on seedlings of Douglas-fir. Forest Science. 31(4): 945-952; 1985.

The allelopathic potential of leaf litter from five species of broadleaf trees and shrubs found in southwestern Oregon on the germination and early growth of Douglas-fir was examined. Although each of these species showed significant allelopathic potential when tested in a highly artificial system against seeds of cucumber, the observed reductions in growth when tested against Douglas-fir ranged from about 44 percent of control growth for Umbellularia californica to about 98 percent of control for Arbutus menziesii. No consistent expression of allelopathy was observed when bioassays, using field soil, were the basis of experimentation. The data show that allelopathy is of potential importance among the many ecological factors which operate under field conditions.

Keywords. Allelopathy, germination (seed), Douglas-fir.

Soil, Site, Geology

Farr, Wilbur A.; Harris, A.S. NA

Site index in the western hemlock-Sitka spruce forest type. In: Alaska/Canada North: neighbours in science; Proceedings, 34th Alaska science conference; 1983 September 28-October 1; Whitehorse, YT. [Place of publication unknown]: Arctic Division, American Association for the Advancement of Science; Ottawa, ON: Northern Program, Department of Indian and Northern Affairs; 1983: 84. Abstract.

Keywords. Site index, latitude (-site, plant-soil relations, old-growth stands.

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Swanson, Frederick J.; Dipert, Duane D.; Roach, Christopher J. NA

The study of the use of leave areas to control in-unit landslides. In: Industry, State, and Federal programs designed to assess and protect water quality associated with managed western forests. Tech. Bull. 466. New York: National Council of the Paper Industry for Air and Stream Improvement; 1985: 29-36.

The Mapleton Ranger District of the Siuslaw National Forest, Oregon, began to prescribe vegetation leave areas in 1975 in an effort to reduce the occurrence of landslides in clearcuts. Leave areas are patches of forest vegetation left on areas judged to have high potential for sliding and damaging fish habitat if clearcut. Of 32 headwall leave areas, 27 (84 percent) were implemented successfully and were not reduced in size or stocking level--either intentionally or inadvertently--during implementation. Of the 32, 4 were reduced in extent intentionally, 2 were eliminated entirely, 1 had conifers removed, 1 was partially burned. Only at one unit was implementation unsuccessful: outside factors (windthrow) prevented establishment of a forested leave area.

Keywords. Landslide, landslide control, Oregon (Siuslaw Natl. For.), Siuslaw Natl. For.--Oregon.

Supply and Demand

Haynes, Richard W. 85-099

Inventory and value of old-growth in the Douglas-fir region. Res. Note PNW-437. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station; 1986. 18 p.

Timber inventory data for all owners in western Washington and western Oregon were summarized by age classes to provide an estimate of the remaining amount of old-growth timber. The data suggest that roughly 30 percent of the timberlands in the Douglas-fir region contain essentially mature timber (stands whose age is in excess of culmination of mean annual increment). Available information on value of old growth is scanty but does suggest that old-growth Douglas-fir is some 56 percent more valuable than second-growth Douglas-fir.

Keywords. Old-growth stands, stumpage prices, stumpage valuation, timber supply.

Warren, Debra D. 86-012

Production, prices, employment, and trade in Northwest forest industries, third quarter 1985. Resour. Bull. PNW-129. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station; 1986. 54 p.

Provides current information on lumber and plywood production and prices; employment in forest industries; international trade in logs, lumber, and plywood; volume and average prices of stumpage sold by public agencies; and other related items.

Keywords. Forestry business economics, lumber prices, plywood prices, timber volume, stumpage prices, employment (forest products industries), marketing (forest products), import/export (forest products), markets (external), economics (forestry business).

Timber Management

Cochran, P.H.; Brock, Terry 85-076

Soil compaction and initial height growth of planted ponderosa pine. Res. Note PNW-434. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station; 1985. 4 p.

Early height growth of ponderosa pine seedlings planted in clearcuts in central Oregon was negatively correlated with increasing soil bulk density. Change in bulk density accounted for less than half the total variation in height growth. Although many other factors affect the development of seedlings, compaction has reduced the rate of height growth.

Keywords. Soil compaction, soil bulk density, increment (height), ponderosa pine.

DeBell, D.S.; Radwan, M.A. NA

Repeated coppicing of cottonwood and alder affects soil properties. Agronomy Abstracts. 1984 November: 258; 1984. Abstract.

Keywords. Coppicing, soil nutrients, site productivity, red alder, cottonwood.

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Juday, Glenn Patrick; Zasada, John C. NA
Structure and development of an old-growth white spruce forest on an interior Alaska floodplain. In: Meehan, William R.; Merrell, Theodore R., Jr.; Hanley, Thomas A., eds. Fish and wildlife relationships in old-growth forests: Proceedings of a symposium; 1982 April 12-15; Juneau, AK. [Place of publication unknown]: [Publisher name unknown]; 1984: 227-234.

Old-growth white spruce forests develop on flood plains in interior Alaska, and ultimately cause degeneration of the site for growing timber as the soil cools and permafrost develops. A sequence of white spruce old-growth stands growing on sites of presumed increasing age is examined with respect to tree age, spacing, basal area, height, diameter, and distribution.

Keywords. Old-growth stands, flood-plain forests, stand development, stand characteristics, site productivity, white spruce, Alaska (interior), interior Alaska.

Radwan, M.A.; Shumway, J.S. NA
Soil nitrogen and phosphorus to predict growth response of western hemlock and Douglas-fir to nitrogen fertilization. In: Proceedings, nitrogen assessment workshop; [Dates of meeting unknown]: [Place of meeting unknown]. Reg. For. Nutrition Res. Proj. Rep. 2. Seattle: University of Washington, College of Forest Resources; 1984: 72. Abstract.

Keywords. Soil nitrogen, soil phosphorus, nitrogen fertilizer response, growth response, western hemlock, Douglas-fir.

Radwan, M.A.; Shumway, J.S. 84-249
Response of Douglas-fir seedlings to nitrogen, sulfur, and phosphorus fertilizers. Res. Pap. PNW-346. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station; 1985. 14 p.
Effects of nitrogen, sulfur, and phosphorus fertilizers on growth and nutrient content of Douglas-fir seedlings potted in Grove and Bunker forest soils were determined. Growth was primarily stimulated with nitrogen in the Grove soil and with phosphorus in the Bunker soil. Fertilization influenced nutrient levels in the seedlings. Growth results agree with observed response of Douglas-fir to fertilization in the field where the soils were collected. Data also suggest that low phosphorus and/or high nitrogen may be responsible for lack of positive growth response of Douglas-fir to nitrogen fertilizer on some sites.

Keywords. Fertilizer response, nutrient elements (plant), plant-soil relations, seedling growth, Douglas-fir.

Watershed Management

Lyons, Joseph Kevin NA
Influences of landslides, floods and land use on channel changes of the upper middle fork Willamette River, Oregon 1936-1980. Corvallis, OR: Oregon State University; 1981. 100 p. M.S. thesis.

Widening of the channel and aggradation in the middle fork of the Willamette River resulted from floods in the winter of 1964-65 and associated landslides, particularly in clearcuttings and road rights-of-way along major tributaries.

Keywords. Fluvial processes, sedimentation, flood (-forest damage, landslide, clearcutting, channels (river).

Ricks, Cynthia L. NA
Flood history and sedimentation at the mouth of Redwood Creek, Humboldt County, California. Tech. Rep. 15. Arcata, CA: U.S. Department of the Interior, National Park Service, Redwood National Park; 1985. 154 p.

Since the early 1950's, the distribution of sediment at the mouth of Redwood Creek in Humboldt County, California, has been altered by the effects of channel aggradation and channelization along the lower reach. Severe flooding in 1953, 1955, and 1964 caused bank erosion, landsliding, and changes in channel geometry along Redwood Creek. The increased sediment load resulted in channel aggradation and widening along the lower flood plain. Flood control levees constructed from 1966 to 1968 channelized the lower reach of Redwood Creek and extended beyond the last downstream meander. The distribution of erosional and depositional sites at the mouth has been more drastically altered by the effects of channelization than of aggradation. Sediment accumulation has altered the seasonal sequence of migration and closure of the outflow channel that determines the embayment water volume, substrate distribution, and water quality during the low flow period from spring to early fall. More frequent closures and flooding of backwater areas and adjacent pastures have historically led to artificial breaching of the berm. In the past, such premature breaching released 75 percent of the embayed water volume being used by 20,000 juverile salmonids for summer rearing habitat.

Keywords. Geomorphology, sedimentation, floods, California.

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Sidle, Roy C.; Pearce, Andrew J. NA
O'Loughlin, Colin L.
Hillslope stability and land use. Wat. Resour. Monogr. 11. Washington, DC: American Geophysical Union; 1985. 140 p. (Copies available from: American Geophysical Union, 2000 Florida Ave., N.W., Washington, DC 20009.)

Landslides are major earth-shaping and sediment-transporting processes in mountainous terrain. Many major landslides result from infrequent rainfall or seismic events that induce unstable conditions on otherwise stable slopes. In addition to threatening human life and personal property, landslides can deteriorate water quality and stream habitat by sedimentation and can seriously decrease land productivity. Extensive (for example, timber harvesting, vegetation conversion) and intensive (for example, roadbuilding, residential development) land management practices predispose marginally stable hillslopes to landslides, often in conjunction with natural factors such as rainfall or earthquakes. Intensive practices generally accelerate landsliding to a greater extent (an order of magnitude or more) than do extensive practices within a given area; however, extensive practices should be a primary concern when stability of a landscape is assessed because larger areas of land are affected.

Keywords. Mass movement, soil stability, erosion, landslide.

Wood Utilization

LeDoux, Chris B. NA
Production rates and costs of cable yarded wood residue from clearcut units. Forest Products Journal. 34(4): 55-60; 1984.

Wood residue is a little used source of fiber, chips, and fuel because costs of harvesting the residue are largely unknown. This study calculates incremental production rates and costs for yarding and loading logging residue in clearcut old-growth Douglas-fir/western hemlock forests. Harvest operations were observed for two timber sales in western Oregon. Three different cable yarding machines were used in various configurations: highlead, shotgun skyline ("Flyer"), running skyline, and skyline with haulback.

Keywords. Residues, wood utilization, production rates, yarding costs, costs (logging), cable logging, clearcutting.

Sampson, George R.; Ernst, Susan NA
Product recovery potential for fire-killed white spruce in interior Alaska. In: Technology and the scientist: Proceedings, 1985 Arctic science conference (36th Alaska science conference); 1985 September 27-29; Fairbanks, AK. [Place of publication unknown]: American Association for the Advancement of Science, Arctic Division; 1985: 67. Abstract.

Keywords. Lumber recovery, fire effects, white spruce, Alaska (interior), interior Alaska.

General, Nontechnical

Bergstrom, Dorothy NA
Beavers: biologists "rediscover" a natural resource. Forestry Research West. 1985 October: 1-5.

The role of the beaver in initiating ecological changes that affect entire watersheds and contribute to nutrient cycling is being uncovered by researchers at the USDA Forest Service, Pacific Northwest Station. Studies of fish habitat have convinced some researchers that the beavers' role in nutrient cycling may be as important as their better known role in regulating streamflow.

Keywords. Animal behavior, nutrient cycling, streamflow, beavers.

Brookes, Martha NA
Scientists, managers, and modelers work on root diseases. Forestry Research West. 1985 August: 12-15.

Keywords. Root rot, root diseases, models.

Pacific Northwest Forest and Range Experiment Station 84-176
Old Growth Update. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station; 1984 August. 6 p. Newsletter.

Summarizes news from the Old-Growth Wildlife Habitats Research and Development Program, a cooperative research effort in the Douglas-fir region by the USDA Forest Service (Pacific Northwest Region and Pacific Northwest Forest and Range Experiment Station) and the U.S. Department of the Interior, Bureau of Land Management. Contains short articles on: the role of fallen trees in relation to ecosystem function, research results to date, a symposium on spotted owls, juvenile mortality of spotted owls, new publications, and administrative news from the Program.

Keywords. Wildlife habitat, old-growth stands, research programs.

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